

Cabbage Transplant Production Using Organic Media, 2008

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Introduction

Successful transplant production begins with good growing media. Healthy vigorous transplants will be less susceptible to insects, diseases and transplant shock leading to better crop performance. Formulating organic potting mixes is especially challenging. Organic sources of nitrogen such as compost can be inconsistent. Compost can change over time with storage and N release can be unpredictable. Many organic potting mixes are supplemented with nitrogen sources such as alfalfa meal, soybean meal and blood meal. An alternative to compost is vermicompost. Vermicompost is thought to be a more soluble nitrogen source as an amendment for organic potting media. Past research in the Rangarajan lab has shown improved yield with vermicompost compared to thermophilic compost. The object of this project is to create an improved potting media for organic vegetable transplant production. Here, we tested six different potting media for growth and productivity of cabbage.

Transplant production

The cooperator grower has an organically managed greenhouse for vegetable transplant production. The facility is being operated to comply with all the NOFA-NY (local certifier) and NOP requirements. The growers mix was Sunshine Organic Blend (SunGro) plus Fertrell 5-5-3 (Fertrell Co, Bainbridge, PA, 12 lbs/yd³). Sunshine Organic Blend ingredients are Canadian sphagnum peat moss, coarse grade perlite, gypsum, dolomitic lime, and a long-lasting wetting agent. Vermicompost (Worm Power, Avon, NY), Alaska hummus (Fertrell Co, Bainbridge, PA) and blood meal mix were added to the growers mix on farm (Table 1). The grower was interested in supplementing his mix with blood meal and Alaska hummus to improve plant growth at their facility. Treatment mixes were placed into 338-cell flats. Before planting, sub-samples of all potting mix treatments were sent to the University of Massachusetts Soil and Plant Tissue Testing Laboratory, Amherst, MA, for chemical analysis (Table 2). Cabbage seedling production started on April 12, 2008. Organic cabbage seed cv. 'Kaitlin' (Seedway, Elizabethtown, PA) was planted in the tray filled with mixes. The seed trays were placed on racks in a germination room (70 ° F for 1.5 days and then moved to the greenhouse. The plants were grown at approximately 75° F day and 55° F nights. Vitazyme (1/3 ounce per 500 sq ft, Fertrell Co, Bainbridge, PA) was applied three days after trays were moved to the greenhouse. Fertrell 2-3-1 (1 gallon/4350 sq ft, Fertrell Co, Bainbridge, PA) was applied as a foliar spray every four to five days. Ten plants from each treatment were cut at soil level, dried and weighed to determine aboveground biomass on April 25, May 5, May 12, 19 and 27 (Figure 1).

Results and Discussion

Nitrate-N and ammonium-N were most affected by amendment choice (Table 2). Vermicompost increased nitrate-N by about 600 mg/kg when added to a mix. Blood meal increased ammonium-N by about 300 mg/kg when added to a mix. Alaska Hummus increased both nitrate-N and ammonium-N by only 100 mg/kg when added to the grower's mix.

Overall plant growth was superior in grower mix + vermicompost and grower mix + bloodmeal (Figure 1). Grower mix, grower mix top dressed with vermicompost, grower mix + Alaska humus, grower mix + vermicompost produced much smaller transplants than other mixes in this growing environment. Growth was not enhanced by adding Alaska Hummus or vermicompost only to the grower mix.

This experiment was repeated at Cornell University's organic greenhouses in May 2008 at a higher greenhouse temperature which greatly affected the results (Cabbage Transplant Production Using Organic Media at Cornell)¹. In the supplemental trial the combination of 10% vermicompost and blood meal produced the highest transplant biomass. Additional trials are being carried out at set temperatures in order to better understand the effect of temperature on performance of organic potting media amendments.

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Table 1. Organic transplant media evaluated for the production of cabbage.

Treatment	Formulation
Grower mix	SunGro Sunshine Organic Blend plus Fertrell 5-5-3 (12 lbs/yd ³)
Grower mix plus Blood meal mix	Grower mix with blood meal, green sand and rock phosphate (7 lbs/yd ³)
Growers plus Dairy vermicompost 10% (v/v)	Our mix plus dairy vermicompost
Growers plus Dairy vermicompost 10% (v/v) plus Blood meal mix	Grower mix plus dairy vermicompost with blood meal, green sand and rock phosphate (7 lbs/yd ³)
Growers mix topped with vermicompost	SunGro Sunshine Organic Blend plus Fertrell 5-5-3 (12 lbs/yd ³)
Growers mix plus Alaska Hummus 10%(v/v)	SunGro Sunshine Organic Blend plus Fertrell 5-5-3 (12 lbs/yd ³) plus Alaska Hummus

¹ <http://cwmi.css.cornell.edu/cabbagcornell.pdf>

Table 2. Nutrient analysis of organic potting media 2008.

Media	Bulk density (g/cm ³)	Coarse frag	pH	EC (ds/M) ^y	mg/kg					
					% total N	Nitrate-N	Ammonium-N	% OM	% Estimated organic C	Carbon/N ratio
Grower's mix	0.15	3.5	6.4	2.25	0.97	198	233	55.9	30.2	31.1
Grower's plus BM ^z	0.22	8.2	6.8	1.93	1.07	200	526	56.8	30.7	28.7
Grower's mix plus 10% vermicompost plus BM	0.2	5.0	7.3	3.44	1.92	171	211	61	32.9	17.2
Grower's mix plus 10% alaska hummus	0.23	5.4	6.5	1.57	0.89	288	315	62.2	33.6	37.7
Grower's mix plus 10% vermicompost	0.32	5.4	7.1	3.43	1.43	758	226	64	34.6	24.2

^ydS/m = 1mmho/cm = 1 mS/cm = 1000 uS/cm

^zBM equals Blood meal, rock phosphate and green sand (7 lbs/yd³ of each)

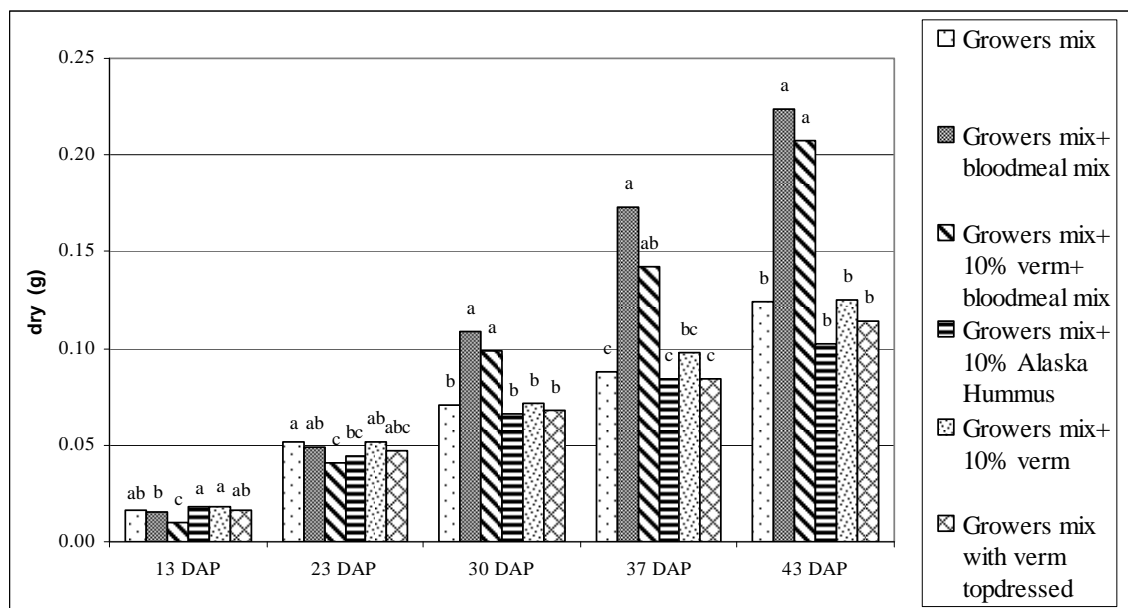


Figure 1. Seeds were sown on 4/12/08 in 338-cell trays and were grown at 75° F day and 55° F night temperatures. DAP = days after planting cabbage seed. Columns labeled by a different letter on the same plant date are significantly different at p<0.05.



Figure 2. Cabbage seedlings grown in grower's mix amended with 10% vermicompost and blood meal (L, spotty germination) and 10% vermicompost (R.)



Figure 3. Cabbage transplants in grower's mix + 10% vermicompost + blood meal.



Figure 4. Cabbage transplants in growers base mix + blood meal.